

CLAIMS

1. A label comprising:

(A) a polymer facestock having an upper surface and a lower surface;

and

(B) an adhesive layer derived from at least one two-part, high solids curable adhesive overlying the lower surface of the polymer facestock.

2. The label of claim 1, wherein the adhesive cures without application of an external energy source.

3. The label of claim 1, wherein the two-part curable adhesive further comprises a tackifier or plasticizer, or a mixture thereof.

4. The label of claim 1, wherein the two-part curable adhesive has an initial tack sufficient to remain in a position when applied to a substrate.

5. The label of claim 1, wherein the two-part curable adhesive, when applied to the label, has a viscosity in the range from about 30,000 cps to about 120,000 cps.

6. The label of claim 1, wherein the coat weight of the adhesive layer is from about 5 to about 30 g/m².

7. The label of claim 1, wherein the polymer facestock is a polyester or poly- α -olefin or metallized polyolefin, or polylactic acid polymer.

8. The label of claim 7, wherein the polymer facestock is a biaxially oriented polypropylene or a biaxially oriented polyethylene terephthalate.

9. The label of claim 1, wherein the upper surface of the polymer facestock is corona treated or flame treated.

10. The label of claim 1, further comprising a barrier or tie coating layer between the polymer facestock and the two-part curable adhesive.

11. The label of claim 1, further comprising a print layer overlying the upper surface of the polymer facestock.

12. The label of claim 11, further comprising a transparent protective layer overlying the print layer.

13. The label of claim 11, wherein the protective layer comprises a polyamide, polyurethane, cellulosic polymer, silicone polymer, or any combination thereof.

14. The label of claim 11, further comprising a transparent abrasion, chemical, and/or ultraviolet resistant layer overlying the print layer.

15. The label of claim 11, further comprising an adhesion promoting layer between the upper surface of the polymer facestock and the print layer.

16. The label of claim 11, further comprising a layer of ink receptive composition between the upper surface of the polymer facestock layer and the print layer.

17. The label of claim 1, wherein the adhesive comprises (a) an epoxy resin and a primary amine, a carboxylic acid or a carboxylic anhydride or a mixture of two or more thereof; (b) a cyclic anhydride and a primary amine; (c) an oxazoline and a primary amine, a carboxylic acid or a carboxylic anhydride or a mixture of two or more thereof; (d) a carbodiimide and primary amine or a carboxylic acid; or (e) an isocyanate and a primary amine, an alcohol or a carboxylic acid, or a mixture of two or more thereof; or a mixture of two or more of (a)-(e).

18. The label of claim 1, wherein the two-part curable adhesive comprises at least one epoxy resin which is a diglycidyl ether of a bisphenol, a diglycidyl ether of an aliphatic glycol, an epoxidized olefin, a polymer- or rubber-modified epoxy resin, or a mixture of two or more thereof and an epoxy curing agent.

19. The label of claim 18, wherein the epoxy curing agent is a primary amine, diamine or polyamine or a carboxylic acid, dicarboxylic acid, polycarboxylic acid, or an anhydride of such acid.

20. The label of claim 18, wherein the two-part curable adhesive further comprises a reactive diluent.

21. The label of claim 1, wherein the two-part curable adhesive comprises (b) a cyclic anhydride and a primary amine.

22. The label of claim 21, wherein the cyclic anhydride comprises a maleated polyolefin, terephthalic anhydride, naphthalic anhydride; pyromellitic dianhydride; 2,3,6,7-naphthalene tetracarboxylic dianhydride; 3,3',4,4'-diphenyl tetracarboxylic dianhydride; 1,2,5,6-naphthalene tetracarboxylic dianhydride; 2,2',3,3'-diphenyl tetracarboxylic dianhydride; 2,2-bis(3,4-dicarboxyphenyl) propane dianhydride; bis(3,4-dicarboxyphenyl) sulfone dianhydride; 3,4,9,10-perylene tetracarboxylic dianhydride; bis(3,4-dicarboxyphenyl) ether dianhydride; naphthalene-1,2,4,5-tetracarboxylic dianhydride; naphthalene-1,4,5,8-tetracarboxylic dianhydride; 2,6-dichloronaphthalene-1,4,5,8-tetracarboxylic dianhydride; 2,7-dichloronaphthalene-1,4,5,8-tetracarboxylic dianhydride; 2,3,6,7-tetrachloronaphthalene-1,4,5,8-tetracarboxylic dianhydride; phenanthrene-1,8,9,10-tetracarboxylic dianhydride; 2,2-bis(2,3-dicarboxyphenyl) propane dianhydride; 1,1-bis(2,3-dicarboxyphenyl) ethane dianhydride; 1,1-bis(3,4-dicarboxyphenyl) ethane dianhydride; bis(2,3-dicarboxyphenyl) methane dianhydride; bis(3,4-dicarboxyphenyl) methane dianhydride; bis (3,4-dicarboxyphenyl) sulfone dianhydride; benzene-1,2,3,4-tetracarboxylic dianhydride; 3,4,3',4'-benzophenone tetracarboxylic dianhydride; 2,3,2',3'-benzophenone tetracarboxylic dianhydride; 2,3,3',4'-benzophenone tetracarboxylic dianhydride; pyrazine-2,3,5,6-tetracarboxylic dianhydride; thiophene-2,3,4,5-tetracarboxylic dianhydride, similar dianhydrides, and mixtures of two or more of the foregoing.

23. The label of claim 21, wherein the primary amine comprises methylene dianiline, meta-phenylene diamine, paraphenylene diamine, 4,4'-diaminodiphenyl sulfone, 3,3'-diaminodiphenyl sulfone, 4,4'-diaminodiphenyl oxide, 2,4-diaminotoluene, 3,3'-diaminodiphenyl methane, 1,3-diamino propane, 1,4-diamino butane, 1,6-diamino hexane, 1,8-diamino octane, 1,12-diamino dodecane and mixtures of two or more thereof.

24. The label of claim 1, wherein the two-part curable adhesive comprises c) an oxazoline and a primary amine, a carboxylic acid or anhydride or a mixture of two or more thereof.

25. The label of claim 24, wherein the oxazoline comprises 4,4',
5,5'-tetrahydro-2,2'-bisoxazole; a 2,2'-(alkanediyl) bis [4,5-dihydrooxazole], e.g.,
2,2'-(1,4-butanediyl) bis [4,5-dihydrooxazole]; and 2,2'-(1-methyl-1,3-propanediyl)
bis (4,5-dihydrooxazole); a 2,2'-(arylene) bis [4,5-dihydrooxazole], e.g.,
2,2'-(1,4-phenylene) bis [4,5-dihydrooxazole], 2,2'-(1,5-naphthalenyl) bis
[4,5-dihydrooxazole] and 2,2'-(1,8-anthracenyl) bis [4,5-dihydrooxazole]; and
alkylene bis 2-(arylene) [4,5-dihydrooxazole], e.g., methylene bis
2-(1,4-phenylene) [4,5-dihydrooxazole]; a 2,2',2''-(arylene) tris
[4,5-dihydrooxazole], e.g., 2,2',2''-(1,3,5-phenylene) tris[4,5-dihydrooxazole];
oligomeric materials with pendent oxazoline groups such as poly [2-(alkenyl)
4,5-hydrooxazole], e.g., poly [2-(2-propenyl) 4,5-dihydrooxazole], and mixtures of
two or more thereof.

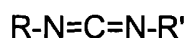
26. The label of claim 24, wherein the carboxylic acid or cyclic
anhydride comprises a maleated polyolefin, terephthalic anhydride, naphthalic
anhydride; pyromellitic dianhydride; 2,3,6,7-naphthalene tetracarboxylic
dianhydride; 3,3',4,4'-diphenyl tetracarboxylic dianhydride; 1,2,5,6-naphthalene
tetracarboxylic dianhydride; 2,2',3,3'-diphenyl tetracarboxylic dianhydride; 2,2-
bis(3,4-dicarboxyphenyl) propane dianhydride; bis(3,4-dicarboxyphenyl) sulfone
dianhydride; 3,4,9,10-perylene tetracarboxylic dianhydride; bis(3,4-
dicarboxyphenyl) ether dianhydride; naphthalene-1,2,4,5-tetracarboxylic
dianhydride; naphthalene-1,4,5,8-tetracarboxylic dianhydride; 2,6-
dichloronaphthalene-1,4,5,8-tetracarboxylic dianhydride; 2,7-
dichloronaphthalene-1,4,5,8-tetracarboxylic dianhydride; 2,3,6,7-
tetrachloronaphthalene-1,4,5,8-tetracarboxylic dianhydride; phenanthrene-
1,8,9,10-tetracarboxylic dianhydride; 2,2-bis(2,3-dicarboxyphenyl) propane
dianhydride; 1,1-bis(2,3-dicarboxyphenyl) ethane dianhydride; 1,1-bis(3,4-
dicarboxyphenyl) ethane dianhydride; bis(2,3-dicarboxyphenyl) methane
dianhydride; bis(3,4-dicarboxyphenyl) methane dianhydride; bis (3,4-
dicarboxyphenyl) sulfone dianhydride; benzene-1,2,3,4-tetracarboxylic
dianhydride; 3,4,3',4'-benzophenone tetracarboxylic dianhydride; 2,3,2',3'-
benzophenone tetracarboxylic dianhydride; 2,3,3',4'-benzophenone

tetracarboxylic dianhydride; pyrazine-2,3,5,6-tetracarboxylic dianhydride; thiophene-2,3,4,5-tetracarboxylic dianhydride, the corresponding acids of any of the foregoing anhydrides, and mixtures of two or more of the foregoing.

27. The label of claim 24, wherein the primary amine comprises methylene dianiline, meta-phenylene diamine, paraphenylene diamine, 4,4'-diaminodiphenyl sulfone, 3,3'-diaminodiphenyl sulfone, 4,4'-diaminodiphenyl oxide, 2,4-diaminotoluene, 3,3'-diaminodiphenyl methane, 1,3-diamino propane, 1,4-diamino butane, 1,6-diamino hexane, 1,8-diamino octane, 1,12-diamino dodecane and mixtures of two or more thereof.

28. The label of claim 1, wherein the two-part curable adhesive comprises (d) a carbodiimide and primary amine or a carboxylic acid, or a mixture of two or more thereof.

29. The label of claim 28, wherein the carbodiimide has the general structural formula:



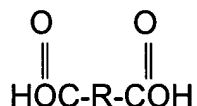
or



wherein R and R' are independently a substituted or unsubstituted, branched or unbranched aliphatic or aromatic hydrocarbyl group and x = 1 to about 100.

30. The label of claim 28, wherein the primary amine comprises methylene dianiline, meta-phenylene diamine, paraphenylene diamine, 4,4'-diaminodiphenyl sulfone, 3,3'-diaminodiphenyl sulfone, 4,4'-diaminodiphenyl oxide, 2,4-diaminotoluene, 3,3'-diaminodiphenyl methane, 1,3-diamino propane, 1,4-diamino butane, 1,6-diamino hexane, 1,8-diamino octane, 1,12-diamino dodecane and mixtures of two or more thereof.

31. The label of claim 28, wherein the carboxylic acid is a dicarboxylic acid having the general formula:



wherein R is a saturated or unsaturated aliphatic or an aromatic moiety having from 2 to about 30 carbon atoms.

32. The label of claim 1, wherein the two-part curable adhesive comprises (e) an isocyanate and a primary amine, an alcohol or a carboxylic acid, or a mixture of two or more thereof.

33. The label of claim 32, wherein the isocyanate is a compound having the following formula:

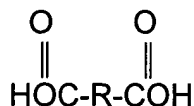


wherein $n=2-4$, and Q denotes an aliphatic hydrocarbon group having 2 to about 18 carbon atoms, a cycloaliphatic hydrocarbon group having from 4 to about 15 carbon atoms, an aromatic hydrocarbon group having from 6 to about 18 carbon atoms, or an aryl-aliphatic hydrocarbon group having from about 8 to about 15 carbon atoms.

34. The label of claim 33, wherein the amine is an aliphatic, aromatic or aryl-aliphatic diamine or polyamine having a molecular weight of from about 60 to about 300.

35. The label of claim 33, wherein the alcohol is a saturated or unsaturated polyhydric alcohol having a molecular weight in the range from about 62 to about 400.

36. The label of claim 33, wherein the carboxylic acid is a dicarboxylic acid having the general formula:



wherein R is a saturated or unsaturated aliphatic or an aromatic moiety having from 2 to about 30 carbon atoms.

37. A label comprising:

(A) a polymer facestock having an upper surface and a lower surface, wherein the polymer facestock is a biaxially oriented polyethylene terephthalate or polypropylene; and

(B) an adhesive layer derived from at least one high solids, curable adhesive composition comprising (a) an epoxy resin and a primary amine, a carboxylic acid or a carboxylic anhydride or a mixture of two or more thereof; (b) a cyclic anhydride and a primary amine; (c) an oxazoline and a primary amine, a carboxylic acid or a carboxylic anhydride or a mixture of two or more thereof; (d) a carbodiimide and primary amine or a carboxylic acid; or (e) an isocyanate and a primary amine, an alcohol or a carboxylic acid, or a mixture of two or more thereof; or a mixture of two or more of (a)-(e).

38. A labeling process comprising the steps of (A) providing a substrate; (B) coating a two-part, high solids curable adhesive to one surface of a polymeric facestock; and (C) applying the adhesive coated surface of the polymeric facestock to the substrate.

39. The labeling process of claim 38, wherein the substrate is glass, plastic or metal.

40. The labeling process of claim 38, wherein the adhesive comprises (a) an epoxy resin and a primary amine, a carboxylic acid or a carboxylic anhydride or a mixture of two or more thereof; (b) a cyclic anhydride and a primary amine; (c) an oxazoline and a primary amine, a carboxylic acid or a carboxylic anhydride or a mixture of two or more thereof; (d) a carbodiimide and primary amine or a carboxylic acid; or (e) an isocyanate and a primary amine, an alcohol or a carboxylic acid, or a mixture of two or more thereof; or a mixture of two or more of (a)-(e).

41. The labeling process of claim 38, wherein the polymer facestock is a biaxially oriented polyethylene terephthalate or polypropylene.